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EXAMINER

VIGUSHIN, JOHN B

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 05/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/051,703

Applicant(s)

VOLSTORF, JAMES R.

Examiner

John B. Vigushin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-18 is/are rejected.
- 7) ☒ Claim(s) 2, 3, 19 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 0302 6) ☐ Other:

DETAILED ACTION

Abstract

1. The abstract of the disclosure is objected to because it is in excess of 150 words.

Correction is required. See below and MPEP § 608.01(b).

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet **within the range of 50 to 150 words**. **It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited**. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Objections

3. Claims 1, 19 and 20 are objected to because of the following informalities:

In Claim 1, line 10: "boards" should be changed to --board--.

In Claim 1, line 11: "boards" should be changed to --board--.

In Claim 1, line 17: "an" should be changed to --a--.

In Claim 19, line 10: "boards" should be changed to --board--.

In Claim 19, line 11: "boards" should be changed to --board--.

In Claim 19, line 25: "hole" should be changed to --holes--.

In Claim 19, line 25: --to-- should be inserted after "board".

In Claim 19, line 33: --of-- should be inserted after "pairs".

In Claim 19, line 40: --of-- should be inserted after "pairs".

In Claim 19, line 47: --of-- should be inserted after "pairs".

In Claim 19, line 54: --of-- should be inserted after "pairs".

In Claim 20, line 10: "boards" should be changed to --board--.

In Claim 20, line 11: "boards" should be changed to --board--.

In Claim 20, line 29: "hole" should be changed to --holes--.

In Claim 20, line 29: --to-- should be inserted after "board".

In Claim 20, line 37: "traces" should be changed to --surface mount pads--.

In Claim 20, line 44: "traces" should be changed to --surface mount pads--.

In Claim 20, line 45: "traces" should be changed to --surface mount pads--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 5-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a) Claim 5, line 9, recites "a second face electrically conductive surface mount *pads*" (italic emphasis by the Examiner). The singular "a" conflicts with plural "*pads*."

b) Claims 6 and 7 depend from rejected base Claim 5 and therefore inherit the defects of the claim.

c) Claims 8-16 generally recite the limitation "said....pads." There is insufficient antecedent basis for this limitation in the claim. Claims 8-16 depend from Claim 5 which recites "a first face electrically conductive surface mount pad" (line 2 of Claim 5) and "a second face electrically conductive surface mount pads [sic]" (line 9 of Claim 5). This rejection of Claims 8-16 may be overcome by amending Claim 5 as follows:

(i) In Claim 5, lines 2-3, the following amendment is recommended (bold emphasis by the Examiner):

a **plurality of** first face electrically conductive surface mount pads
mounted on said first face of said mid-plane printed circuit board, **each of said first
face electrically conductive surface mount pads** connecting one of said electrical.....

(ii) In Claim 5, lines 9-10, the following amendment is recommended (bold emphasis by the Examiner):

a **plurality of** second face electrically conductive surface mount pads
mounted on said second face of said mid-plane printed circuit board, **each of said
second face electrically conductive surface mount pads** connecting one of said
electrical.....

Rejections Based On Prior Art

6. The following reference was relied upon for the rejections hereinbelow:

Hughes (US 4,472,765)

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 4 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Hughes.

As to Claim 1, Hughes discloses a midplane PCB 4 including a first face and a second face in parallel to each other (Fig. 3); a first PCB 8 surface mounted on the first face of midplane PCB 4 (Fig. 1), the first PCB 8 containing pairs of electrical connections 34 (Fig. 1; col.3: 13-17); a second PCB 18 surface mounted on the second face of midplane PCB 4 (Fig. 1), the second PCB 18 containing pairs of electrical connections 34 (Fig. 1), the second PCB 18 mounted at an orthogonal angle to first PCB 7 (Fig. 1; col.2: 50-51); a plurality of pairs of via holes (i.e., the pair of horizontally related holes in diamond-shaped conductive areas 40 and 40A that are aligned with ZIF connector-receiving holes 37 and 37A; and the pair of vertically related holes in diamond-shaped shaped conductive areas 40 and 40A that are aligned with ZIF connector-receiving holes 41 and 41A) on the first and second faces of midplane PCB 4 (Figs. 3 and 4) positioned with respect to the orthogonal angle of misalignment of first and second PCBs 8 and 18 (Figs. 3 and 4; col.3: 31-38 and 43-48), the horizontally related and vertically related pairs of via holes in conductive areas 40 and 40A on the first face of midplane PCB 4 directly overlaying the horizontally related and vertically related pairs of via holes in conductive areas 40 and 40A on the second face of midplane PCB 4 (Figs. 3 and 4; col.3: 31-38); a plurality of electrical paths (pins and hole-plating) through the overlaying vertically related pairs of via holes in conductive

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areas 40 and 40A and through the overlaying horizontally related pairs of via holes in conductive areas 40 and 40A connecting the pairs of electrical connections 34 on the first PCB 8 to the electrical connections 34 on the second PCB 18 (Figs. 2, 3 and 4; col.3: 21-38).

As to Claim 4, Hughes further discloses that the ZIF pins 35 and 39 are evidently the same length (Fig. 3), and the plated via holes 37, 37A, 41, 41A and the horizontally and vertically related via holes in conductive areas 40 and 40A are evidently the same length as the thickness of midplane PCB 4 (Fig. 3). Therefore, the electrical paths are substantially equal in length.

As to Claim 17, Hughes further discloses that first and second PCBs 8 and 18 are orthogonal (Fig. 1; col.2: 50-51).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hughes.

Hughes discloses the limitations of base Claim 1 but does not teach that the first and second PCBs 8 and 18 are five-by-eight header boards. Hughes discloses the PCBs 8 and 18 as cards (boards) in an electronic circuit system comprising an interconnected assembly of circuit cards (Fig. 1). Since a specific function ("header")

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and form factor ("five-by-eight") of the cards are not required or taught by Hughes as essential to the inventive features of the disclosed circuit structure, and since the Applicant has not disclosed in the Specification of the instant Application that header boards having the form factor of "five-by-eight" dimensional units solves any stated problem or is for any particular purpose, and furthermore, since it appears that the invention of Hughes would perform equally well with PCB header cards 8 and 18 of **any** form-factor required by the electronics application, then it would have been an obvious matter of engineering choice to one of ordinary skill in the art at the time the invention was made to modify the PCBs 8 and 18 to be header boards having a "five-by-eight" form factor in the electrical circuit system of Hughes in order to meet the physical and functional system requirements of the electronics application.

Allowable Subject Matter

11. Claims 2 and 3 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
12. Claims 5-16 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
13. Claims 19 and 20 would be allowable if rewritten to overcome the objection(s) set forth in this Office action.

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14. The following is a statement of reasons for the indication of allowable subject matter:

As to Claim 2, patentability resides in *each via hole in each of the pairs of via holes being fixed on an axis perpendicular to an axis that bisects the angle of misalignment of the first and second printed circuit boards*, in combination with the other limitations of the claim.

As to Claim 3, patentability resides in *each via hole in each of the pairs of via holes being fixed on an axis that bisects the angle of misalignment of the first and second printed circuit boards*, in combination with the other limitations of the claim.

As to Claims 5-16, patentability resides in *a plurality of conductive surface mount pads mounted on the first and second faces of the midplane PCB, each of the conductive surface mount pads connecting: 1) one of the electrical connections on the first PCB to one of the via holes on the first face of the midplane PCB, and 2) one of the electrical connections on the second PCB to one of the via holes on the second face of the midplane PCB*, in combination with the other limitations of the broadest claim, Claim 5.

As to Claim 19, patentability resides in *each via hole in each of the pairs of via holes being fixed on an axis perpendicular to an axis that bisects the angle of misalignment of the first and second printed circuit boards*, in combination with the other limitations of the claim.

As to Claim 20, patentability resides in *each via hole in each of the second face pairs of via holes being fixed on an axis that bisects the angle of misalignment of the*

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first and second printed circuit boards, in combination with the other limitations of the claim.

15. As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a) Smolley (US 5,019,945) discloses, in Fig. 3, a midplane 18 with pairs of wire-wadded via holes 22 (col.4: 19-30; col.5: 8-16), first PCB 16 and second PCB 16. Smolley does not teach or suggest that second PCB 16 is mounted at an angle to first PCB 16.

b) Nellis et al. (US 3,680,037) discloses, in Fig. 4, a midplane 42 with via holes 44 filled with compressible conductive plastic material, first PCB 46 and second PCB 48, said second PCB 48 mounted at an angle to said first PCB 46 (i.e., traces 49 of second PCB 48 are perpendicular with respect to traces 47 of first PCB 46; col.3: 43-50). Nellis et al. does not teach or suggest that via holes 44 of midplane 42 are arranged in pairs with respect to the perpendicular angle of misalignment between first and second PCBs 46 and 48.

c) Kwong et al. (US 6,528,737 B1) discloses a midplane 100 (first face thereof shown in Fig. 2; second face thereof shown in Fig. 3), first PCB 65 and second PCB 55

mounted at an orthogonal angle to first PCB 65 (Fig. 1; col.3: 60-63), pairs 108 of via holes 104 and pairs 108 of via holes 104' on the first and second faces of midplane 100, respectively, positioned with respect to the orthogonal angle of misalignment of first and second PCBs 65 and 55. Kwong et al. does not teach that the pairs 108 of via holes 104 on the first face of midplane 100 (Fig. 2) are directly overlaying pairs 108 of via holes 104' on the second face of midplane 100 (Fig. 3); rather, the via holes 104 and 104' on the first and second faces of midplane 100 are displaced from each other, by means of the inner circuitry routing of midplane 100, instead of directly overlaying each other (Figs. 4 and 5; col.5: 60-65). Also, Kwong et al. does not teach that each via hole 104 and 104' in each of the pairs 108 of via holes (on the first and second faces, respectively, of midplane 100) is fixed on an axis perpendicular to an axis that bisects the orthogonal angle of misalignment of first and second PCBs 65 and 55, or, that each via hole 104 and 104' in each of the pairs 108 of via holes (on the first and second faces, respectively, of midplane 100) is fixed on an axis that bisects the orthogonal angle of misalignment of first and second PCBs 65 and 55 (as evidenced by Fig. 4).

d) Krishnamurthi et al. (US 6,538,899 B1) discloses a midplane 210 having multiple connectors 310 with via holes 330 (Figs. 2A, 3A and 3B; col.3: 58-col.4: 11), first PCBs 220, and second PCBs 230 mounted at an orthogonal, or, any other suitable angle to first PCBs 220 (Fig. 2A; col.3: 37-51). Krishnamurthi et al. does not teach or suggest that via holes 330 on the first and second faces of midplane 210 are arranged in pairs that are positioned with respect to the orthogonal angle of misalignment of the first and second PCBs 220 and 230, respectively.

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17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B. Vigushin whose telephone number is 703-308-1205. The examiner can normally be reached on 8:30AM-5:00PM Mo-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7382 for regular communications and 703-308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



John B. Vigushin
Examiner
Art Unit 2827

jbv
May 13, 2003